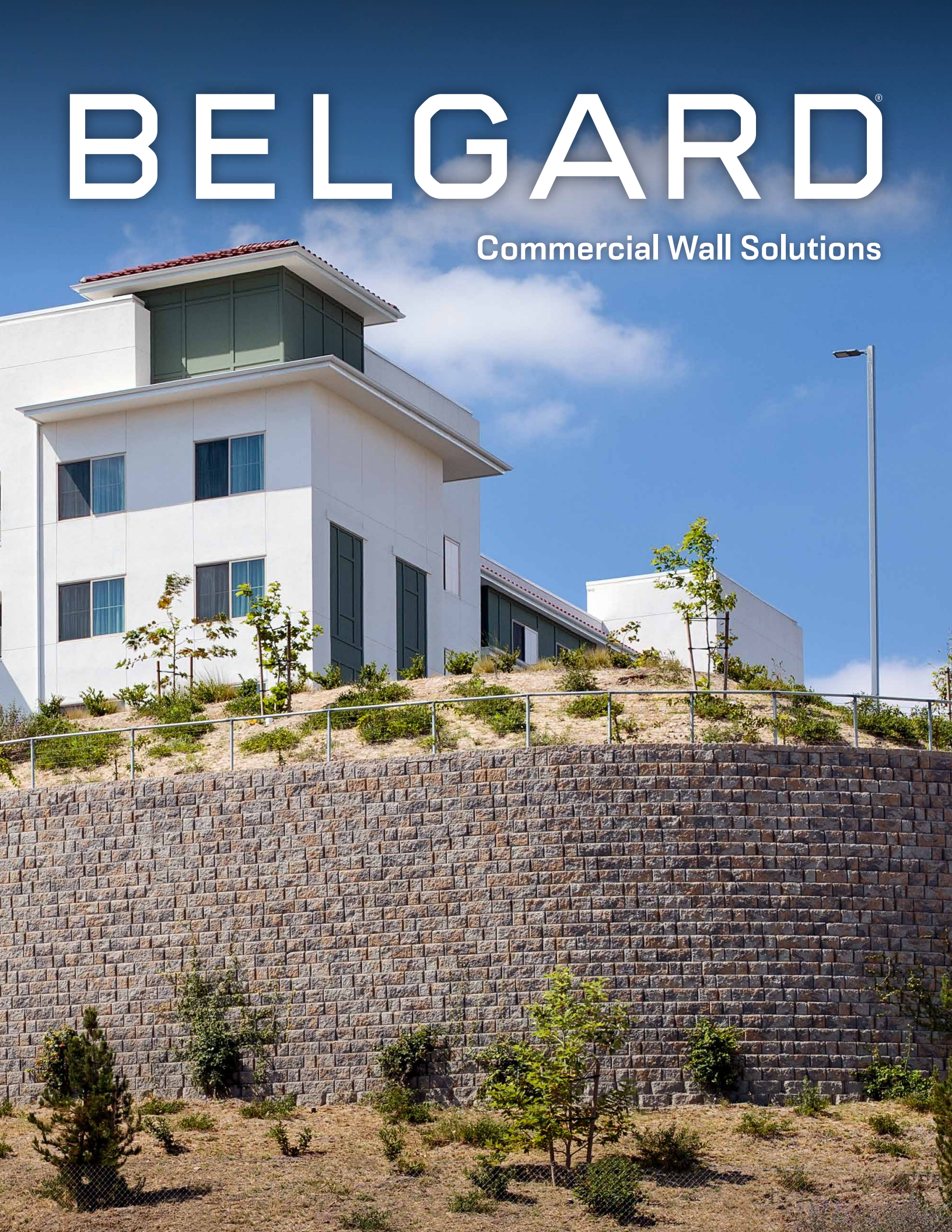
BELGARD®

Commercial Wall Solutions



WHY PROS CHOOSE BELGARD

EXPERTISE
For over 25 years, Belgard has led the hardscape category with proven installation standards and training. Our Belgard Authorized Contractors and certified installers are backed with technical support and resources from takeoff to final walkthrough.

QUALITY
Belgard pavers and walls are engineered for long-term performance and beauty to reduce call-backs. Every product is backed by a transferable limited lifetime warranty, giving your customers confidence in your work.

INNOVATION
Belgard invests over 20,000 R&D hours each year to develop new hardscape systems, textures and installation solutions that help you work faster and build better spaces. Our products set performance standards and keep your offering ahead of trends.

SERVICE
Belgard and the Oldcastle APG family of brands deliver national scale with local manufacturing, distribution and field support. With more than 150 locations, we help keep product available, projects on schedule and jobsites supplied.

DESIGN
Belgard design tools, pattern libraries and visualization resources help you show customers what's possible and sell more complete outdoor living projects. From simple patios to complex multi-level spaces, our portfolio supports your client's vision.

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SMARTER SITES START HERE

WHY SEGMENTAL RETAINING WALLS?

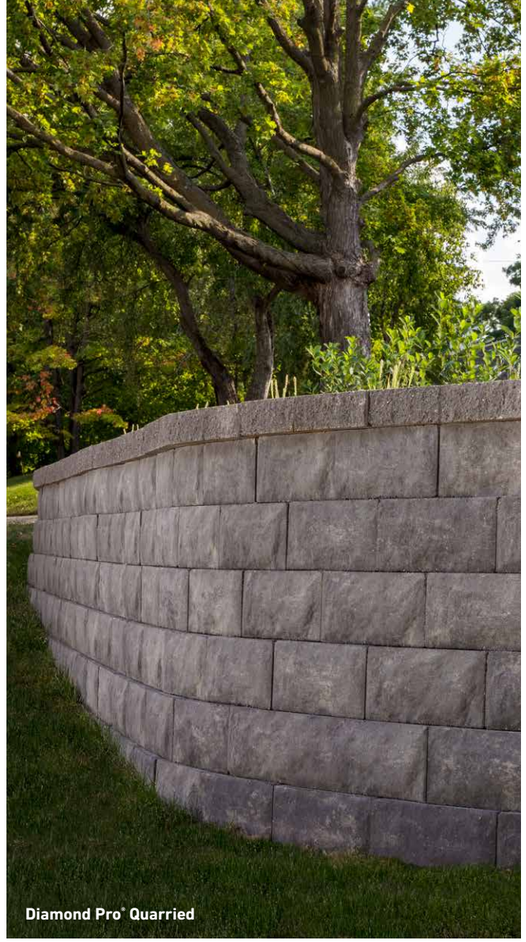
Site grading is a foundational challenge for every project. While there are myriad options for site engineering, none offer the trifecta of constructability, beauty and performance quite like Segmental Retaining Wall (SRW) systems.

Maximize Developable Land

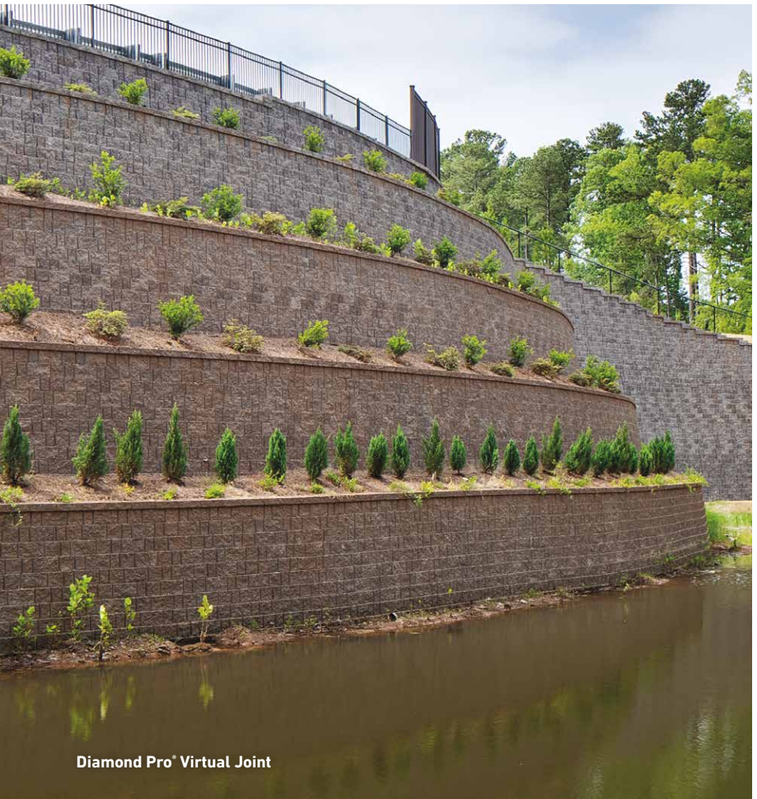
SRW systems deliver steeper grade transitions and stronger structural performance than traditional cut-and-fill slopes—enabling higher density and better site ROI

SLOPE STABILIZATION AND EROSION CONTROL

Soil stabilization is key to maintaining the integrity of the project site. By increasing the stability of the soil, you can increase your useable space on any project site and help prevent unnecessary erosion.



Diamond Pro® Quarried



Diamond Pro® Virtual Joint

WATER MANAGEMENT

The most significant slopes on typical land development projects occur along project perimeters, interior watercourses, stormwater management ponds, wetland boundaries, and between buildings. Segmental retaining walls help preserve valuable real estate by reducing stormwater pond footprints and limiting encroachment into wetlands.

TERRACED WALLS

Terracing walls creates horizontal spaces that may improve landscape maintenance by eliminating steeper slopes that are hard to vegetate and maintain. Terraces can also provide valuable space for utilization of parking, patios and landscape.

- Create more useable space by replacing an unusable slope with flat terrain
- Create a variety of levels on the site, such as terraced gardens and outdoor seating areas

Diamond Pro® Air

Constructability Advantages

SRW systems deliver the performance of cast-in-place concrete with the added benefits of installation flexibility, reduced sensitivity to weather, and minimized long-term maintenance requirements.

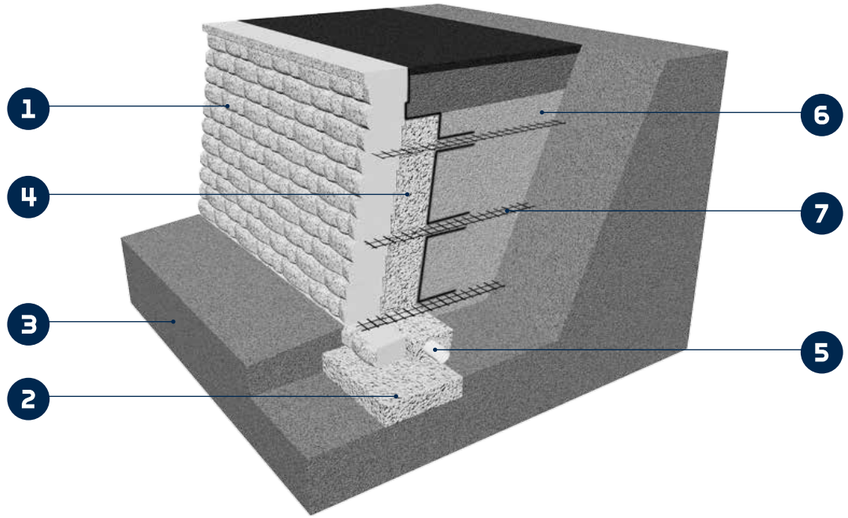
Enhanced Design Flexibility

Modular SRW units deliver design options that poured-in-place concrete walls can't match, including the ability to achieve curves, utilize multiple colors and textures, and better integrate with other site elements like seating, greenery, lighting and more.

THE FUNDAMENTALS OF

RETAINING WALL DESIGN

Although the complex calculations will be handled by civil, geotechnical and wall engineers, effective retaining wall design starts with understanding the elements in the SRW system.



1 SRW Units

Dry-cast blocks adhering to ASTM C1372

2 Leveling Pad

Compacted, dense-graded aggregate used to create a stable, level base

3 Embedment

Graded soil burying a portion of the wall for added stability

4 Drainage Aggregate

A coarse aggregate or gravel that provides stability and drainage

5 Drainpipe

Collect and channel away excess water to ensure stability

6 Reinforced Soil

Soil layered with geogrid that creates a strong, composite mass that supports the wall and earth around it

7 Geogrid

High-strength, synthetic mesh installed in layers behind wall blocks to reinforce the soil

KEYS TO SUCCESS

CRITICAL DESIGN CONSIDERATIONS

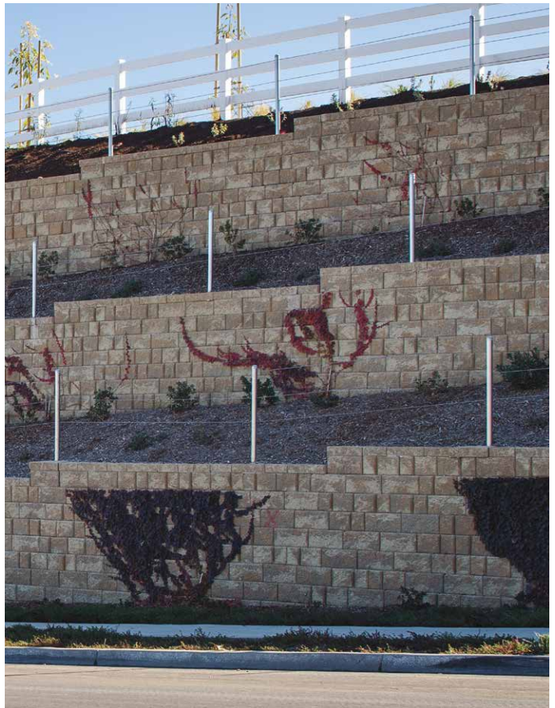
Site Conditions: Slope & Load

Surcharges, or any vertical load on the soil behind the wall, are a critical consideration for geotechnical engineers when designing roads, parking lots, slopes, or tiered structures. Surcharges can cause increased stress within the soil mass, soil settlement, and slope instability.

When installing railing or fencing at the top of a wall, be sure to adhere to IBC 1015.2 and use a post sleeve system like TopGuide™. These sleeves are installed during construction, creating code-compliant post footings.

Soil & Stability

Up to 90% of an SRW system is soil, making soil composition a critical consideration in the design phase. In general, poor soils (silty or high clay content) mean increased reinforcement requirements—more geogrid, thicker embedment and deeper excavation and additional drainage—leading to higher costs and increased risk.



Drainage & Water Management

Water pressure builds behind a wall leading to bulging, cracking or collapse. Some ways to avoid this common wall failure are:

- Create a drainage layer with clean gravel behind the wall
- Wrap the gravel and pipe in geotextiles to filter and prevent clogging
- Install a drainpipe at the base
- Create a gentle slope to direct surface water away

Construction Inspection

COMPACTION
Verify soil and backfill meet 95% Standard Proctor Density, or as determined by the wall design engineer.

CONSTRUCTION MONITORING AT KEY PHASES
Check leveling pad, base course and geogrid placement

VALIDATE MATERIALS
Confirm drainage aggregate, reinforced fill and geogrid specs are met.

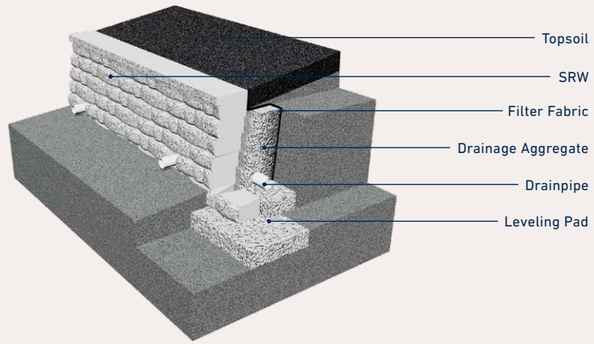
DOCUMENT COMPLIANCE
Provide reports for engineering and code requirements.

TYPES OF

RETAINING WALL CONSTRUCTION

There are multiple approaches to building a segmental retaining wall. Knowing how to select the right system is a critical first step for a successful project.

Gravity Wall



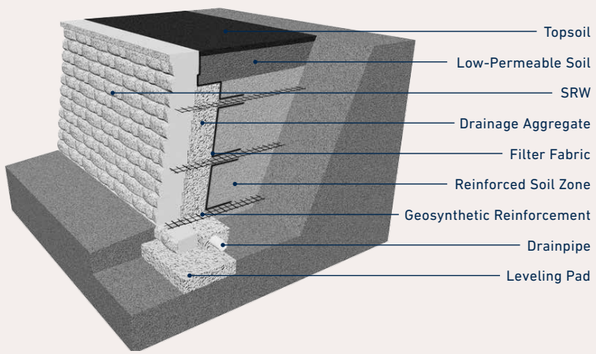
Know Your Wall

A gravity retaining wall relies on the weight, depth, and batter of SRW units to resist soil pressure, without using geogrid reinforcement.

When to Use

Typically limited to heights of 2–3 times the front-to-back depth of the SRW unit, though exact limits depend on the product and project.

Geosynthetic-Reinforced Retaining Wall



Know Your Wall

Geosynthetic-reinforced walls use layers of soil reinforcement, typically geogrids, behind the SRW facing to create a stable mass that resists soil pressure. The SRW units, reinforcement, and soil work together as one system.

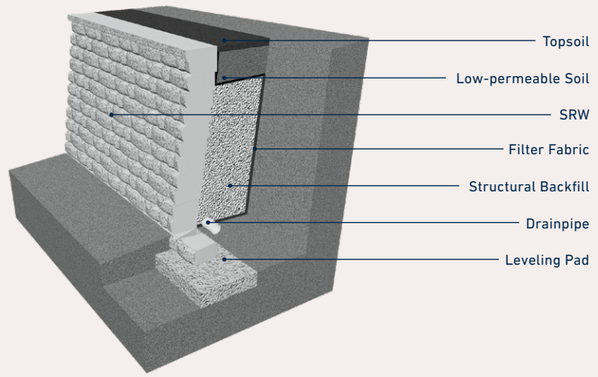
When to Use

Reinforced walls can be designed for much taller heights and heavier loads than gravity walls by lengthening or strengthening reinforcement layers. These systems should always be designed by a qualified engineer and built by experienced contractors.

Engineering Support for Retaining Wall Design

Not every site calls for the same solution. Our team can work with you to evaluate conditions, wall types, and design requirements to help you select the right system.

Structural Backfill



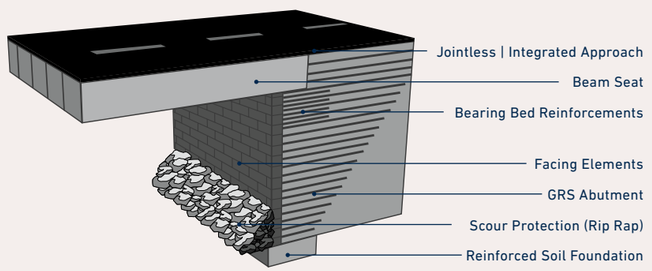
Know Your Wall

Structural backfill walls use specialized material behind SRW units to increase depth and mass, eliminating the need for geosynthetic reinforcement. This backfill also serves as the wall's drainage zone.

When to Use

Use structural backfill when excavation space is limited. It reduces digging, eliminates geogrid reinforcement, and should be installed by qualified professionals. Also known as "no-fines concrete," "stabilized aggregate," or "Anchorplex System®."

Geosynthetic Reinforced Soil-Integrated Bridge System (GRS-IBS)



Know Your Wall

The Federal Highway Administration developed GRS-IBS as an innovative, cost-effective bridge system that uses closely spaced geosynthetic reinforcement layers and compacted aggregate to directly support the bridge superstructure.

When to Use

GRS-IBS offers simple design, fast bridge support construction, and eliminates deep foundations—reducing costs by 25–60% compared to conventional methods.

BEST PRACTICES FOR

WALL SYSTEM ENGINEERING

Highly engineered segmental retaining wall systems require careful coordination between multiple experts.

Key Roles In The Engineering Process

CIVIL ENGINEER / OWNER

- Establish minimum criteria
- Identify retaining wall location
- Develop site grading plan
- Address surface water movement
- Identify utility conflicts within wall zone
- Address handrail & fence placement
- Hires other technical experts:
  - Wall Design Engineer
  - Geotechnical Engineer
  - QA Inspector

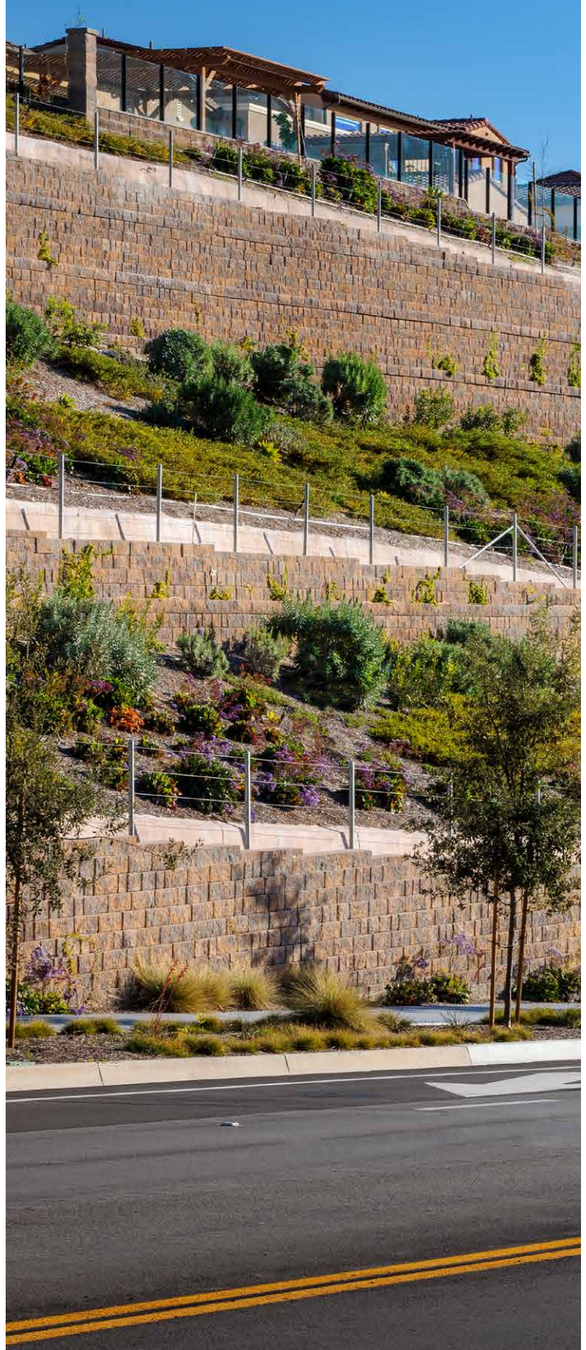
GEOTECHNICAL ENGINEER

- Ensure retaining wall area is included in evaluations
- Assess foundation soil's ability to support wall, including settlement
- Provide site soil strength parameters
- Assess ground water levels
- Provide seismic design parameters
- Perform global stability assessment, ideally in partnership with Wall Design Engineer

WALL DESIGN ENGINEER

- Internal wall design, including specification of soils in reinforced earth zone
- Global stability assessments, ideally in partnership with Geotechnical Engineer
- Settlement / bearing capacity assessments, ideally in partnership with Geotechnical Engineer
- Account for all design variables within SRW wall design envelope

View the Concrete Masonry and Hardscape Association (CMHA)
SRW BEST PRACTICES GUIDE



SUPPORT AT EVERY STEP

ENGINEERING ASSISTANCE

No matter how complex your project requirements or site conditions, our in-house experts can assist with every step of the wall design and engineering process.

☑ Design Services

As experts in the industry, we can assist with every step of the retaining wall design process.

☑ Project-Specific Specifications and Details

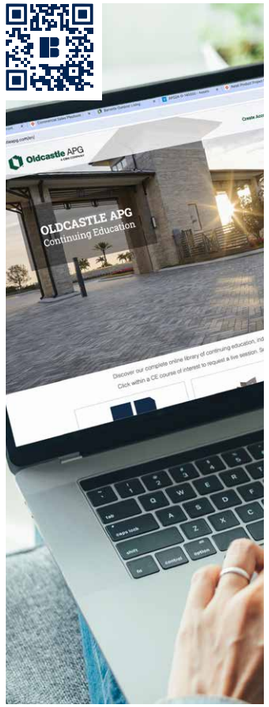
Meet project goals, improve wall performance and reduce liability by leaning on our team to help you choose the right products for your project.

☑ Constructability Reviews

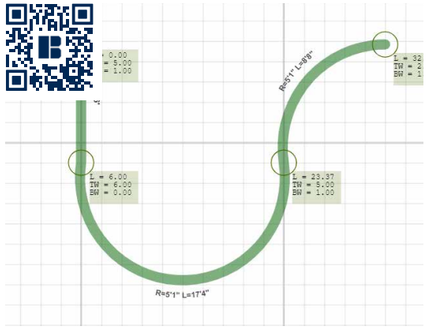
Get a second opinion from our team of experts. We'll review your grading plans and provide product recommendations.

☑ Design Peer Review

Design questions? Our team of experts can assist in design review and provide technical guidance to work out complicated issues.



Continuing Education



Wall Estimator

Technical Resources

Order Samples

Engineering & Design Support

CASE STUDY

COSTCO WHOLESALE

SCAN HERE TO READ THE FULL CASE STUDY

Aggressive Timeline and Steep Grade Change Prove No Match for Belgard Diamond Pro HD.

The Challenge

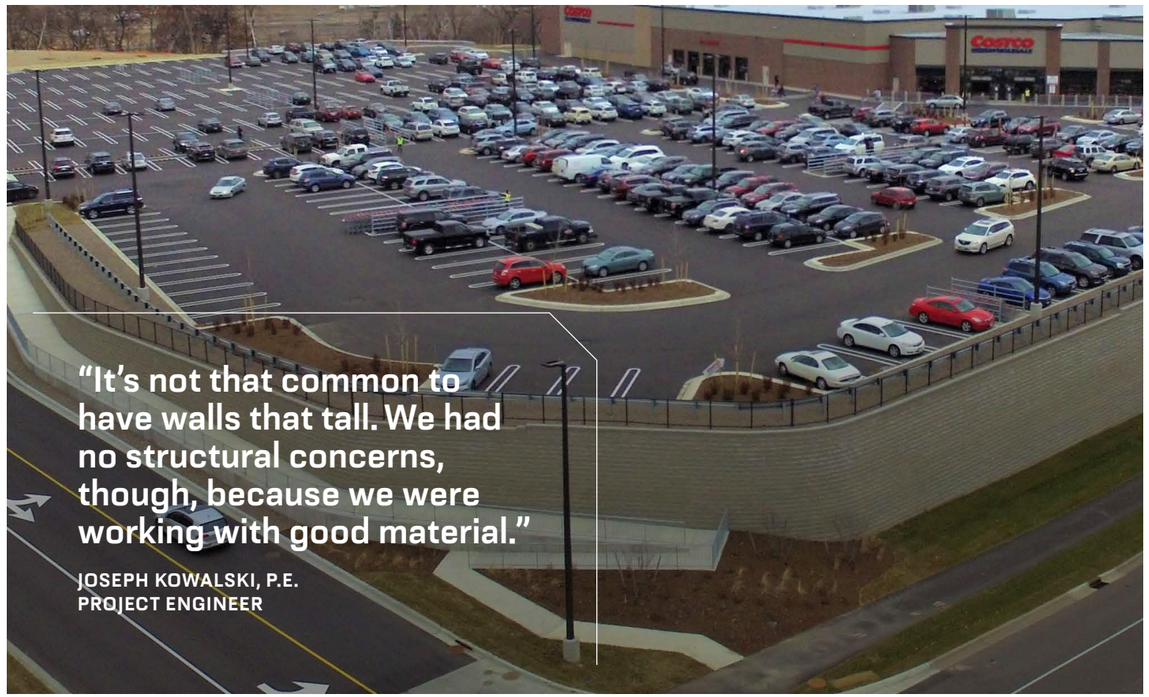
Costco planned a 152,000 sq. ft. warehouse and gas station complex in Eagan, MN on an aggressive 90-day timeline. With over 50 feet of grade changes, the site required seven segmental walls of varying heights plus two vehicle ramp access ways.

The Solution

The team used Belgard Diamond Pro HD to quickly deliver a clean, architectural look that could stand up to Minnesota's harsh freeze/thaw conditions—reinforced with three different types of Mirafi geogrid to meet the site's varying load demands.

The Result

Costco opened the new facility on schedule, with project engineer Joseph Kowalksi, P.E. noting, "Building on a site like this with cast-in-place retaining walls would've been cost-prohibitive. The technology of these types of walls has become more advanced, and engineers are more aware of what can be done with reinforced soils."



CASE STUDY

THE OAKS AT PORTOLA HILLS

SCAN HERE TO READ THE FULL CASE STUDY

Belgard® Wall Systems Crucial to Creating Nearly 100 Buildable Acres in Harsh Geological Conditions

The Challenge

The project required a 99-acre site of California valleys and steep hillsides to be converted into construction-ready flat pads.. The job was complicated by seismic conditions, poor soils with failure planes, the potential for heavy rainfall, and a city requirement that most walls be plantable.

The Solution

The project was delivered in three phases using a combination of Belgard Diamond Pro, Vertica Virtual Joint and Planter blocks, with Mirafi global stability geogrids—including added secondary geogrid layers and longer/stronger grid where required by site conditions.

The Results

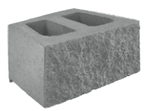
The retaining wall program created buildable "super pads," with some walls reaching 49 ft tall and 1,000 ft long, while the 8:1 batter plantable system maximized site utilization. "Using the various Belgard products provided the client with an additional 66,500 SF (1.5 acres) of usable land compared to using the competition at 4:1 batter," noted project engineer Matthew Merritt, P.E.

FOR YOUR NEXT PROJECT

SELECT THE IDEAL BLOCK

MULTI-WALL PROJECT EFFICIENCIES

Although systems cannot be combined on the same wall, when a project calls for separate walls of varying height, efficiencies can be gained by constructing walls 12 ft. in height and under with lighter weight Diamond Pro Air.

	NEW  Diamond Pro® Air	 Diamond Pro®	 Diamond Pro® PS
DIMENSIONS	8" H x 18" W x 11½" D	8" H x 18" W x 12" D	8" H x 18" W x 12" D
GRAVITY WALL HEIGHT*	3'4"	4'	4' or 2'
SYSTEM BATTER	4°	7.1°	7.1° or 1.7°
WEIGHT	54 lbs.	74 lbs.	75 lbs.
CONNECTION	Lug	Rear Lip	Pin
UNIT COVERAGE	1 sq. ft.	1 sq. ft.	1 sq. ft.
MAX WALL HEIGHT	Engineered walls up to 12 ft.	Engineered walls of any height	Engineered walls of any height
CORE	Large cores align for easy filling	Large cores for ease of handling	Large cores for ease of handling

*Maximum gravity wall heights are project-specific and may be lower than these values depending on actual site conditions.

Note: The same cap and corner are used in all three systems with coordinating colors and face styles.

Put Diamond Pro® to the Test

- ☑ **All Diamond Pro products** meet the strength and dimensional tolerances of ASTM C1372. Third-party testing is available upon request.
- ☑ **All Diamond Pro products** have been reviewed by the ICC Evaluation Service and are included in the ICC-ES Evaluation Report ESR-1959.
- ☑ **Diamond Pro & Diamond Pro PS** are approved with multiple DOTs across the country. The Diamond Pro PS has gone through the rigorous IDEA evaluation process. The Innovations, Developments, Enhancement and Advancements Program (IDEA), was developed by the Federal Highway Administration (FHWA) to provide a protocol for technical evaluation of earth retentions systems. The IDEA program is administered by the Geo-Institute of the American Society of Civil Engineers (ASCE) and is the industry's highest standard of evaluation for earth retention systems.

DIAMOND PRO® SERIES

COLORS & TEXTURES

Tackling a project with more than one wall? The Diamond Pro® Series is designed to match colors, dimensions, and face styles—ensuring a cohesive, professional finish from one wall to the next.

Straight Face


GRAY


TAN


CHARCOAL

Smooth Face


ANTHRACITE


SHADED GRAY


HICKORY

Quarried Face


IRON BAY


ASHWOOD

Want More Options?

Additional colors and face styles are available regionally and by custom order. Scan the QR code above or ask your Belgard Sales Representative for more information.

QUICK REFERENCE

WALL SYSTEM TECHNICAL STANDARDS

Walls are highly complex systems that require careful specification and design to execute. While more details are required, the following references will help get your specs off on the right foot.

Standard Specification Language

- Segmental retaining wall units shall comply with ASTM C1372.
- Walls over 4 feet or subject to surcharge loads shall be designed by a qualified professional engineer, provide geogrid reinforcement meeting ASTM D6637, and install per manufacturer's engineered shop drawings.
- Backfill shall be placed in 6–8 in. lifts and compacted to meet the minimum compaction requirements as determined by the project geotechnical engineer.
- Provide a minimum 12 in. drainage aggregate zone and perforated pipe with positive outflow.

Key Standard References

CMHA DESIGN MANUAL FOR SEGMENTAL RETAINING WALLS

Key references on embedment requirements, reinforced zone depth, drainage diagrams and more.

ASTM C1372 - STANDARD SPECIFICATION FOR DRY-CAST SEGMENTAL RETAINING WALL UNITS

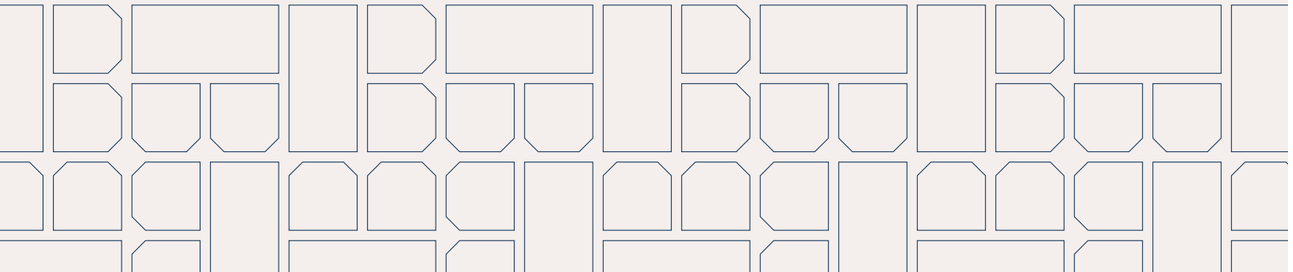
- Compressive strength: ≥ 3,000 psi
- Absorption: ≤ 13 pcf (or manufacturer spec)
- Dimensional tolerances: ± 1/8" height and ± 1/8" length and width

ASTM D6637 - GEOGRID

- Specify grid designed for soil reinforcement
- Reference ultimate strength and long term design strength
- Require manufacturer compatibility with block system

ASTM D698 AND D1557 - MINIMUM COMPACTION REQUIREMENT REFERENCES

- 95% of the Standard Proctor maximum dry density (ASTM D698) for the entire wall height
- 92% modified Proctor maximum dry density (ASTM D1557) for the entire wall height



NOTES

EVERY OUTDOOR POSSIBILITY. ONE TRUSTED PARTNER.

Complete solutions to simplify how pros design and deliver outstanding spaces.

RDI®
Railing

AMERIMIX®
Pre-Blended Mortar

ELEMENTS™
Outdoor Cooking

CATALYST®
Fencing

ECHELON® MASONRY
Veneers & Structural Masonry

FREESTYLE™
Shade & Privacy

PEBBLETEC®
Pool Finishes

BELGARD®
Hardscapes

Oldcastle® APG transforms how pros approach outdoor projects with integrated hardscape, decking, fencing and railing solutions backed by the expertise and resources of one powerful partner. The result is streamlined planning, smoother installs and elevated spaces that help more clients Live Well Outside.

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